Demonstration of Soy-based Fish Feed in West Africa:

The ASA-IM feed-based pond and cage culture project

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Expenditure end date: 29 December 2013

Introduction: (*1. Acknowledgement of the funding assistance received from the Emerging Markets Program. 2. For technical assistance activity, identify the assessment activity that recommended and identified the opportunities in the activity*).

The activities carried out under the 2012 Emerging Markets Program seek to build on work initiated in Ghana under the 2010 Emerging Markets Program, as well as the 2012 Foreign Markets Development Program (FMD) and 2012 Market Access Program (MAP). Both the FMD and MAP programs were very short term so the activity that set up field trials and demonstrations was carried on into this EMP.

Specifically, the activities carried out under the 2012 Emerging Markets Program seek to further reinforce the growing segment of small and medium scale tilapia producers on Lake Volta. Planning and record-keeping skills of small and medium-scale fish farmers were strengthened through trainings and on-site demonstrations, with a focus on each farmers' physical site constraints, immediate markets and access to capital.

As stated in earlier reports, our long-term goal is to demonstrate how the use of soy-based feed can improve profits for fish farmers. However, our prior experience with fish farmers in Ghana have shown that other short-term benchmarks must first be reached before farmers can understand and improve profits on their own farms. In the short-term our objectives were: 1) Train farmers to keep records with regard to stocking density, survival, and feed conversion ratio (FCR), culminating in an analysis of farm expenditures versus farm revenue. This is the first step to improving profitability 2) Provide training and experience for farm owners, their staff and for future farm managers on how to compare feed brands by conducting feed trials using the smaller low volume-high density (LVHD) cages.

Executive Summary: (*Objectives of the project and concise description of the activities undertaken*).

The project was originally proposed to begin July 2012, but contract negotiations and approvals delayed the start of activities until September 2012. Most of the activities for this EMP were undertaken as of January 2013, so as not to overlap with the FMD and MAP that were funded up until October and December, 2012, respectively. The objective as stated in the proposal was to conduct aquaculture feeding demonstrations, workshops and training sessions for fish producers, government/policy makers and feed mill industry in Ghana for the purpose of increasing the demand for soy through increased use of soy-based aquafeeds. However, it was also necessary to help farmers become profitable so they could stay in business, thereby assuring demand for the soy-based feeds.

The activities to be undertaken were:

Two major activities were planned for the Emerging Markets Program (EMP): five on-farm trials/demonstrations with progressive fish farmers and workshops and trainings held for at least 50 other farmers including a visit to one of the demonstration sites.

Five farms were identified as demonstration and training sites: Amoreux Farm at Ashaiman, Ghana, Michel Camp reservoir at Accra, Ghana, Novi Farms at Kpeve, Ghana, Kwame Nkrumah University of Science and Technology (KNUST) at Kumasi, Ghana, and Hahotoé village, Togo.

Interns were funded and trained to work at each of the five demonstration sites, keeping detailed production and feeding records, making key observations with regard to fish feeding response and behavior, conduction bi-weekly to monthly sampling of fish, and gaining valuable practical experience as fish farmers.

1 m^3 cage growout trials were begun at two sites: Novi Farms in Kpeve, Ghana, and Hahotoé village, Togo. 1 m^3 cage growout trials were continued at Michel Camp reservoir.

Pond growout trials comparing a full feeding ration and a half feeding ration with fertilizer were continued at two sites: KNUST in Kumasi, with four additional ponds stocked and Amoreux Farms in Ashaiman.

Workshops and training were conducted on a farmer-to-farmer basis at one of our five farms designated as demonstration sites. Such workshops and training included an evaluation of the participants' current record keeping practices and a thorough demonstration of the record keeping practices used on site. Additionally feeding practices were demonstrated along with a comprehensive explanation of the corresponding feeding responses of the fish.

Benchmarks for quantifying progress in meeting the objectives were:

- At least 50 progressive fish farmers will receive the feed-based fish farming technology training.
- Workshops and trainings will be held for at least 50 other farmers which will include a visit to the demonstration farms and sharing production and cost data. At the end of the production cycle, the results will be summarized and discussed with the farmers and a fish farmers' forum will be held where the results and conclusions are presented by the demonstration farmers themselves.
- International Center for Aquaculture and Aquatic Environments (ICAAE) staff will select up to 4 progressive fish farmers for demonstrations (4 farms maximum) using contacts made in previous activities. After a 2-day training program and review of the previous year's demonstration results, the trial manager and support team will develop management plans with each to be implemented in the coming year on a

portion of their farm; stock the cages and begin monitoring production data such as growth rates, incremental feed conversion, and production costs.

Difficulties Encountered: (*Lessons learned. Description of the difficulties encountered in implementing the project, in particular the project's objectives were not achieved*).

1. Contract negotiations delayed the start of the project, and having concurrent projects made it difficult to manage but we were able to keep the activities separate.

2. We experienced an initial delay in the stocking of several of our cages due to the fingerling shortage widespread in Ghana. The first fingerlings one farmer ordered for the small cages were sold to him at an average weight of less than 1 gram and were in poor condition. He experienced heavy mortality in the cages due to this small stocking weight. In order to obtain larger fingerlings we had to wait additional weeks for the grow-out of sex-reversed fingerlings to be complete.

3. In our previous EMP report it was stated that Ghana had the potential to become West Africa's hub for fish and other animal feed mill operations. While Ghana has yet to realize that potential it has become West Africa's hub for foreign feed manufacturers seeking to enter the West African market. Currently feed is coming into Ghana from Brazil, Ecuador, Israel, Denmark, Netherlands, and the United States, to name a few. Despite the plethora of feed providers, unless the farm in question has the ability to import its feed directly from the foreign manufacturer, no one provider is able to guarantee a steady supply of feed. Small and medium-sized farmers often experience feed shortages of their chosen brand and are frequently forced to switch brands. In our case, we experienced these shortages in the midst of conducting feed trials.

4. This project sought to further develop exports of U.S. agricultural commodities and reduce potential trade barriers in the target market. To that end, this project wanted to establish a baseline of import information on Ghana imports of fish feed, fishmeal, soybeans, and soybean meal, from which to measure progress in this area. Obtaining this import information was extremely difficult. We went through a number of channels before obtaining access to the correct database. Information for our Ghana Import Data Report was compiled after individually examining over 16,000 import records. Thus, it was a major difficulty that was overcome.

Accomplishments: (*Research results, impact on markets and/or exports, results of training, seminars, etc.—successes. Successes are specific, measureable results that are a direct outcome of a project or activity. These include increases in U.S. agricultural exports, entry of U.S. products into new markets, elimination of specific market constraints or barriers, and adoption of U.S. regulations and standards, among others*).

1. Demonstration sites were selected, and management plans developed and implemented for 5 farms. Other farmers were invited to individual or small-group workshops and training. As part of their training, these farmers were given a site visit to one or more of the demonstration sites. There they had the opportunity to see first-hand the activities on going, inspect the record keeping and data management process on site, and better understand the planning and management skills necessary to undertake fish farming activities, even on a small scale. The Appendix lists the names of the farmers trained under the EMP as well as their respective training sites and training dates. One investor from Togo greatly benefitted from having his staff spend more than a month on one of the demonstration farms. He is slated to begin the largest cage operation in Togo, at Lake Nangbéto.

2. Five demonstration sites were developed, and management plans developed and implemented, four in Ghana and one in Togo. The following table shows the demonstration sites and activities. Trial cages (1 m^3) were stocked to serve as production demonstrations at Novi Farms, Michel Camp, and Hahotoé, Togo. Pond trials were undertaken at Amoreux Farms and at KNUST's aquaculture research station.

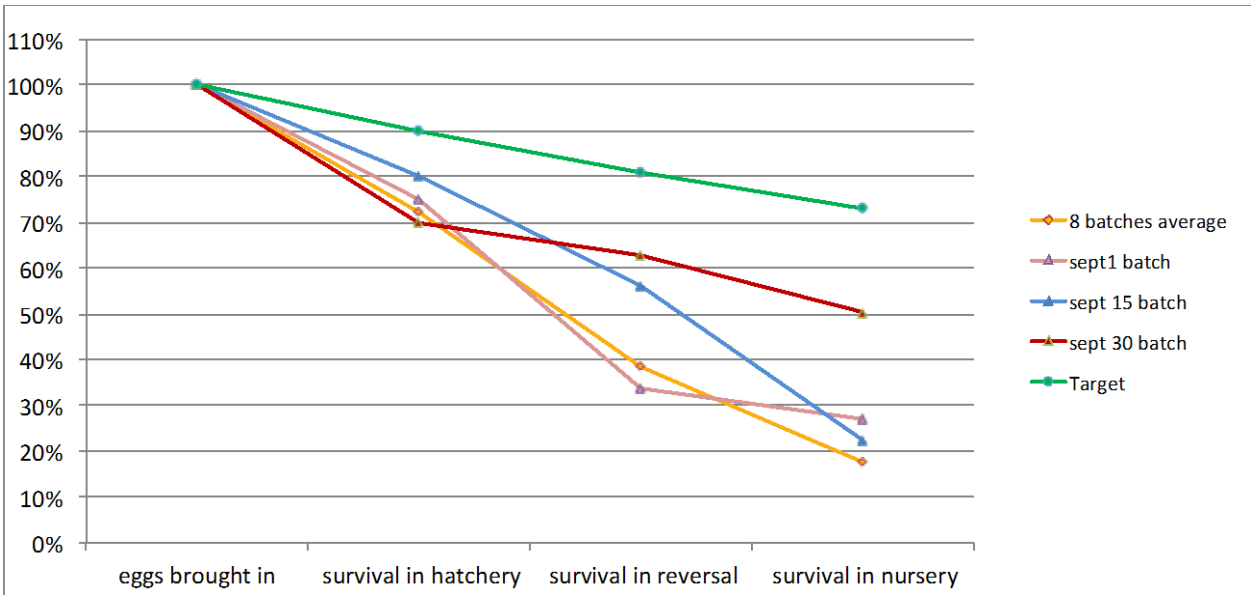
List of demonstration sites and the activities undertaken at each site

Site	System	Stock Date	Activities
Michel Camp Reservoir	8 small 1 cubic meter cages in reservoir	February 4, 2013	8 cages were stocked with fingerlings, fed daily, sampled bi-weekly to 100 grams then monthly until harvest
Amoreux Farms	2 ponds, 1,000 meters squared or more	November 1, 2012	A half ration of commercial feed plus fertilizer was compared with a ration of bran plus fertilizer
Novi Farms	small 1 cubic meter cages on Lake Volta, plus tracking of production data from nursery production	March 13, 2013	4 cages were stocked with fingerlings and 2 feeds tested

KNUST Farm	6 ponds (3 replicates of 2 protocols), 200 meters squared each	January 22, 2013 February 25, 2013 April 12, 2013	One protocol called for half ration and fertilizer. The other protocol called for a full ration of feed only
Hahotoé, Togo	small 1 cubic meter cages placed in abandoned phosphorous mining pit	June 14, 2013	6 cages were stocked in demonstration of High Volume Low Density (HVLD) production methods.

3. Data was compiled for imports of soybeans, soybean meal, fishmeal and fish feeds into Ghana. Prior gathering this information little was known, other than anecdotal evidence from several of the larger farms, as to the major contributing countries as well as importing trends with regard to these four commodities. Having this information as a baseline for soy use and importation, in all of its forms, will provide all future actors in the arena an opportunity to gauge the efficacy of efforts to increase the amount of soy used in aquaculture. The report titled, Ghana Import Data, is available in its entirety as a separate document at the end of this report. A draft of this report was supplied to the Foreign Agriculture Service in Accra in September, 2013.

4. Continued focus and emphasis of record keeping throughout our trainings and conversations with farm owners, farm managers, farm workers and beginning farmers has greatly improved the information gathering, record keeping and question asking of our partners. Moreover, with at least one our partners the conversation has moved beyond the standard stocking, feeding and harvesting data. The questions being asked at Novi Farms now encompass the totality of their fish production operation as they begin to track the cumulative survival of their fish from egg through nursery. Furthermore, the farm manager was assisted with identifying points of intervention after she presented us with records that compared her actual data with the targeted survival at each stage of production. The graph below shows the average of eight batches prior to September 1st had a cumulative survival of 17.6%. With improvements in water quality management and feed management, the cumulative survival in the three stages increased to 50.4% for the three batches of fry produced in September. Improved survival through the nursery phase at Novi farms is a direct result of using improved record-keeping to identify needed management improvements.



5. The low-cost and immense functionality of the 1 m^3 cages has interested producers of all levels as well as NGO's who wish to assist small-scale farmers begin cage culture. The 1 m^3 cage represents the highest growth potential per cubic meter of cage and the lowest financial risk to the farmer in terms of initial infrastructure investment, labor and security. The table below shows that a small cage with frame and floats we used in our trials and promoted to partner farms costs less than $75.

Cage Costing: 1 x 1 x 1 meter cage (Ghana Cedis; 2GhC = $1)

Item	Cost/Bulk	Unit of Measurement	Cost/Unit	Units Used/Cage	Total Cost
1 1/4" angle iron	16.20	meter	2.76	5.88	16.20
1 1/2" flat iron bar	17.00	meter	2.89	2.48	7.17
3/4" square galvanized pipe	16.20	meter	3.24	6	19.44
3/8" rebar	4.80	meter	0.52	0.64	0.34
Paint	--	gallon	30.00	0.17	5
Thinner	--	gallon	20.00	0.10	2
Labor (cage frame)	20.00	cage	20.00	1	20.00
Netting Material	420.00	m2	2.10	6.2	13.02
Labor (cage net)	20.00	cage net	20.00	1	20.00
Floats	--	float	2.50	4	10.00
Total					**113.17GhC**

***Success Story: (*In one paragraph please describe why the project was successful (if applicable), and how federal funding solved a problem the industry could not have overcome on its own*).

Progress on U.S. feed exports to Ghana and the region

Auburn University has been influential in promoting and facilitating exports of U.S. fish feed and fish feed inputs to West Africa, especially Ghana and Nigeria. Cargill sent its first feed to Ghana under the EMP and the Quality Samples Program in 2011. We conducted a training program at Crystal Lake Fishery where one of the trainees became very interested in the Cargill feed that was demonstrated. He immediately went to Cargill Ghana offices and asked to be their first vendor. His name was Dr. Sam Doamekpor and he is now their main feed distributor in Ghana. Additionally, multiple visits were made to sales representatives on each of our trips to provide further instruction on feed management issues and to help them answer questions from their clients, because it is our firm belief that the feed dealer with the best technical assistance, especially in terms of feed management, will gain the largest share of the market. As of now, Cargill keeps running out of feed because they have greater than anticipated sales, despite their feed being priced considerably higher than the Ghana made, Raanan feed. Presently all Cargill feed comes to Ghana out of the Franklinton, LA feed mill in the US. Fish feed can be considered as a value-added soy product because soybean meal makes up well over 25% of most fish feed in the US. Cargill sales in Ghana last year were 1,200 metric tons and for 2013, they expect over 2,000 metric tons. Cargill also sells in Nigeria. Zeigler Bros (location Lancaster, PA) also sells fish feed in Ghana and Nigeria where Auburn's technical assistance in marketing has been very helpful. Zeigler Bros.' sales have grown tremendously, especially in Nigeria. We do not have the exact figures but from conversations with the company we know it to be in the thousands of tons. Local production of fish feed in Ghana (Raanan West Africa) continues to grow as well. Their new fish feed extrusion plant, located in Pram Pram, Ghana uses US-made equipment. They source soybeans from Ghana and soybean meal from a variety of origins, but mostly India and Argentina at this time.

CONCLUSIONS AND RECOMMENDATIONS

Sales agents of some of the fish feed distributors in Ghana are very interested in following Auburn's online training program called, Certification of Aquaculture Professional (CAP). As this report has made clear, the feed distributor with the best technical assistance will likely win the battle for market share.

Aquaculture activities have developed in Ghana and neighboring countries, Togo and Nigeria, to the point that an Auburn-based training for fish feed distributors and farm managers is needed. Training on fish feed management for optimizing profits, and training on water quality management will be of great use. When discussed with our partners and training participants, their interest in this type of intense training at Auburn University was

overwhelming. In future years, participants could come from Ghana, Togo and Nigeria, Zimbabwe, Uganda and Kenya. Cost-share by the farm owners is possible; most likely in the form of self-financing participant travel to the US. Auburn has the means to hold a training program in French for the francophone countries as well. US fish feed companies and aquaculture equipment dealers will be very interested in presenting at such a training program.

PRINCIPALS

- Dr Ron Phelps: on campus PI until June 2013(Auburn cost-share).
- Ms. Karen L. Veverica, Auburn: on campus co-PI, data analyzer and trainer in Ghana and Togo made three trips of one to 2 weeks each.
- Ms. Mollie Smith: Auburn, outreach specialist, spent 2 ½ months in Ghana spread over 3 trips for intern backstopping, training, data collection and farmer advising.
- Dr. Gabriel Koko, Fish for Africa: contracted to oversee the intern program, small cage trials at Michel Camp and Hahotoe (Togo) and all logistics within Ghana and Togo.
- Mrs. Ethel Welsing-Yorke: former fish farm manager: assisted with intern program and was responsible for sourcing and compiling the Ghana import data.
- Dr. Daniel Adjei-Boateng: Lecturer at KNUST and organizer of the pond-based trials at the KNUST station.

APPENDIX

List of trainees benefitting from demonstrations and longer term internships on fish farms in Ghana and Togo.

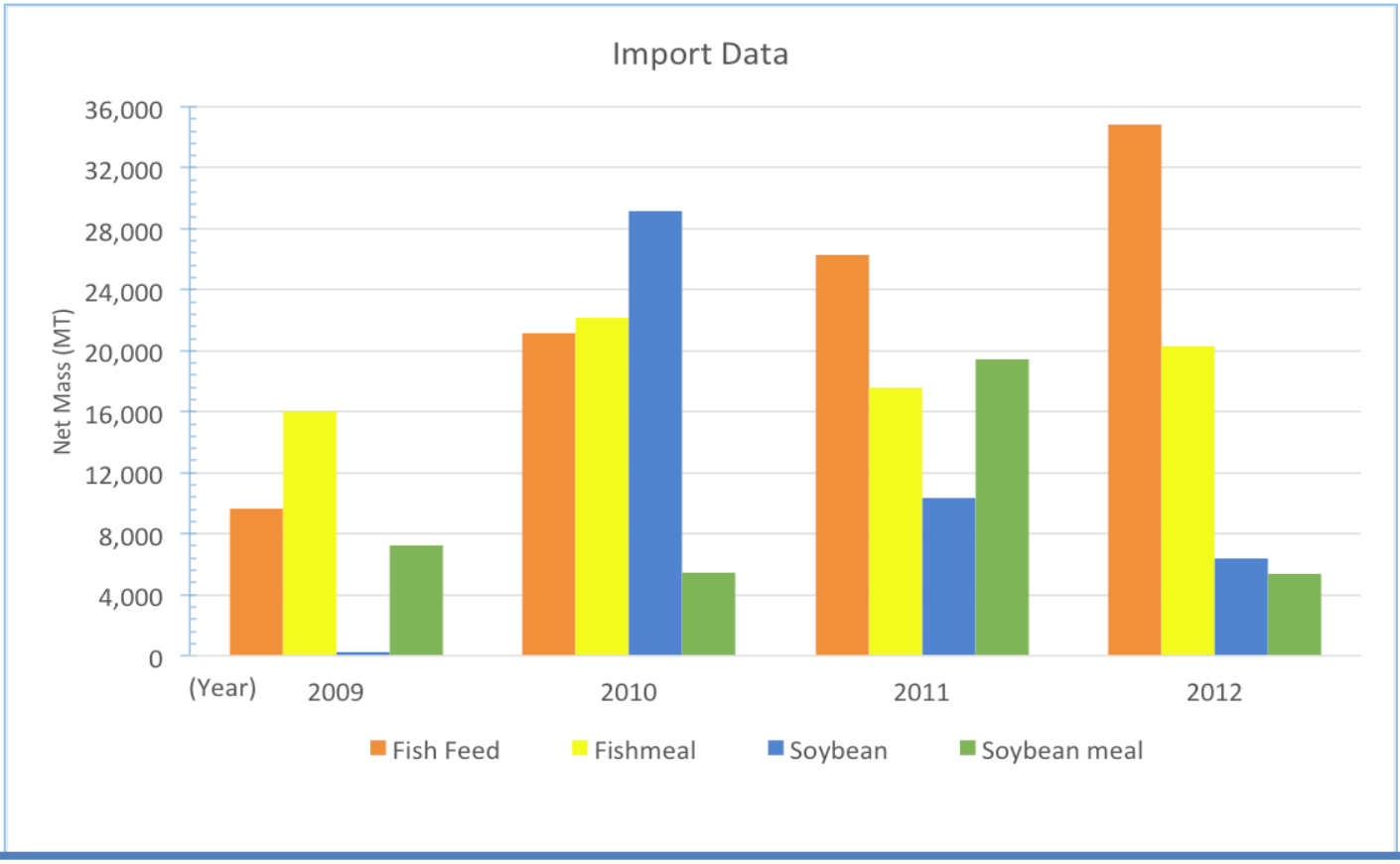
Trainee	**Position**	**Training Site**	**Training Dates**
Richard Amoabeng	owner	Michel Camp Cages, Ghana	May 5, 2013; June 22, 2013; September 7, 2013
Michael Fiafor	owner	Amoreux Farm, Ghana	June 22, 2013
Dr. Ernest Afflu	owner	Novi Farms, Ghana	Weekly, during Sep'12- Sep'13
Ms. Ronah Nabukeera	manager	Novi Farms, Ghana	April 30, 2013; July 8-9, 2013; July 19-20, 2013
Collins Duodu Prah	intern	KNUST, Ghana	September 19-21, 2013
Linda Sarbah	intern	Novi Farms, Ghana	July 8-9, 2013; July 19-20, 2013
Paulina Okpei	intern	Novi Farms, Ghana	July 8-9, 2013; July 19-20, 2013
Serge N'feide	intern	Hahotoe, Togo	September 10, 2013; September 27-28, 2013
Erick Setondji	intern	Amoreux Farm, Ghana	June 22, 2013; September 7, 2013
Moevi Akoe Adovi Dodji	intern	Michel Camp Cages/Amoreux Farm, Ghana	June 22, 2013; September 7, 2013
Okyere Hakeem Enock	skilled worker	Novi Farms, Ghana	March 12, 2013; July 19-20, 2013
Moro Eliasu	skilled worker	Novi Farms, Ghana	March 12, 2013; July 19-20, 2013
Emmanuel Obiri Laryea	skilled worker	Novi Farms, Ghana	April 30, 2013; March 12, 2013
Regis Sena Atinoukpo	intern	Michel Camp Cages/Amoreux Farm, Ghana	Jan and Feb 2013
John Atra	skilled worker	Novi Farms, Ghana	July 19-20, 2013; September 6, 2013
Jules Bali	skilled worker	Novi Farms, Ghana	July 19-20, 2013; September 6, 2013
Nigel Abbey	owner from Togo	Novi Farms, Ghana	Months of April and Sept 2013
Edem G. Sronkpo (Nigel's Manager)	manager from Togo	Novi Farms, Ghana	January 15-February 15, 2013

Banoupi Nate	skilled worker from Togo	Novi Farms, Ghana	January 15-February 15, 2013
Efoe Amekugee	skilled worker from Togo	Novi Farms, Ghana	January 15-February 15, 2013
Fola Fapohunda	owner/manager	Laveroff Farms, Ghana	September 13-14, 2013
Adievi Kodio Apawou	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Amenouwogbe Miwonouko	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Soke Amedome	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koffi Sessi	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Dovi Adjevi	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koffi Adzogble	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Kokouvi Akakpo	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koffi Lodonou	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Komi Alessou	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Akossiwa Tchalla	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koffi Tchalla	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koumedzina Follydjin	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Koko Amedome	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Taoufik LOKPE-ADJABADJO	intern	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Kossi D. MIWONOUKO	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Ayoko GABA-DOVI	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Marcus K. AZIALE	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Komlan MIWONOUKO	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Kossi MIWONOUKO	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Akossiwa ABOTSI	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013

Akossiwa Odette AGBEGNANOU	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Afi DOWUI	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Marie EKLOU	beginning fish farmer	Hahotoé, Togo	September 10, 2013; September 27-28, 2013
Yaw Esuamah	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2013
Akampia Billy	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2014
Eric Oppong	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2015
John Kwablah	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2016
John Tetteh Mcarthy	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2017
Samuel Owusu Donkor	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2018
Michael Ahelegbe	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2019
Joyce Okudjeto	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2020
David Batsa	farm manager	Ashaiman ARDC*, Ghana	July 12-13, 2021
Edmund Datuah	farm Director	Ashaiman ARDC*, Ghana	July 12-13, 2022
Narteh	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2023
Tetteh Kwablah	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2024
Cephas Azaaglo	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2025
Mohammed	skilled worker	Ashaiman ARDC*, Ghana	July 12-13, 2026

* ARDC is the Aquaculture Research and Demonstration Center; a government station.

GHANA IMPORT DATA



Introduction

Auburn University's International Center for Aquaculture and Aquatic Environments (ICAAE), in conjunction with the American Soybean Association has been working in Ghana to promote the use of soybeans and soybean meal in aquaculture. Anecdotally, ICAAE came to the conclusion that more and more soybean and soybean meal were coming into the country already embedded in the fish feed. In order to add statistical support to this hypothesis, ICAAE has worked to compile import data between the years 2009 to 2012 for fish feed, fishmeal, soybeans and soybean meal coming into Ghana. This information combined with ICAAE's experience over the past two years paints a more perfect picture of soy's growth in the Ghana aquaculture sector.

Materials and Methods

The Ghana Revenue Authority, Ministry of Food and Agriculture Animal Production Directorate, and Ghana Statistical Service were contacted for information regarding imports of fish feed, fishmeal and soy products. However it was soon discovered that these three organizations were all three taking their information from the Ghana Revenue Authority's (GRA) Ghana Trade Net/Ghana Customs Net. The GRA was asked to supply information regarding fish feed, fishmeal, soybean meal, and soybean imports, by country of origin for the calendar years beginning in 2009 through 2012. Data until June 2013 were received, but are not reported here.

Fish feed and fishmeal data were extracted from a combined animal feed database of 16,831 records. Records related to fish feed and fishmeal were extracted from the database, totaling 2,985 and 383 records respectively. Soybean meal and soybean records were found in the combined animal feed database as well as soy the soy import database. 274 records, covering the four years in question, were found in the soy and soy product import records and an additional 163 records of soy product imports were obtained from the combined animal feed database.

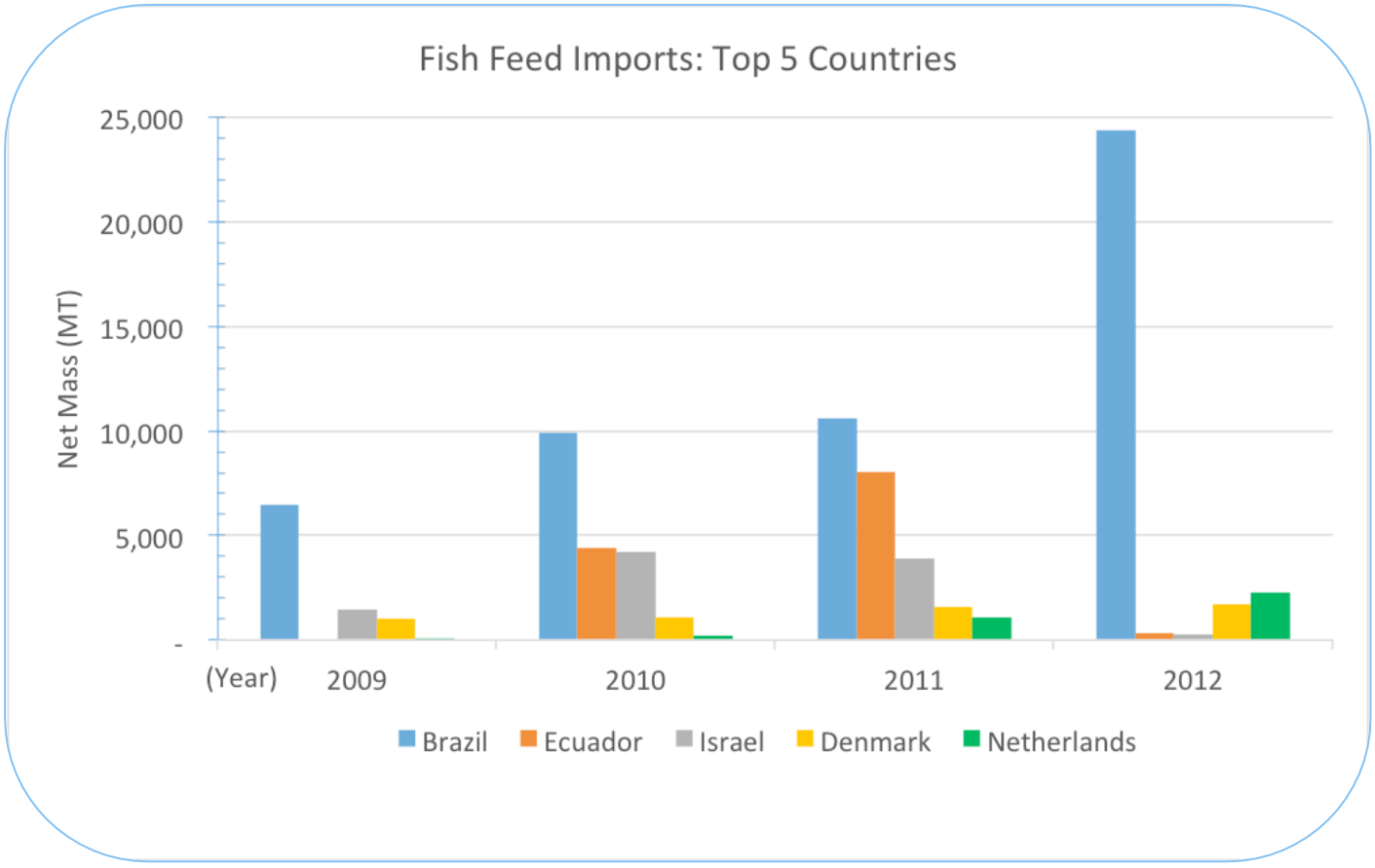
Dates of import were embedded in the declaration number, thus each record had to be identified. Country of origin is reported using a two-letter code, which was not readily available upon request from the GRA. It was suggested by the GRA to do an Internet search, and the codes were found at www.mfcl2000.com/doc/port_codes.pdf.

Several flaws in the data were discovered. The most likely cause of these errors was misapplication of the country codes, for example Denmark (DK) and Germany (DE). Country of origin mistakes were able to be corrected where the feed brand was noted in the product description column.

Another source of error resulted from the country of transshipment being labeled as the country of origin. For example, Coppens feed, which is a product of the Netherlands, was at times possibly shipped out of Antwerp, Belgium. Where the brand was identified corrections were made. However, if there was no record of brand name, the record was left unchanged. For example, small amounts of fish feed coming from Germany could not be verified by brand and were simply labeled "fish feed".

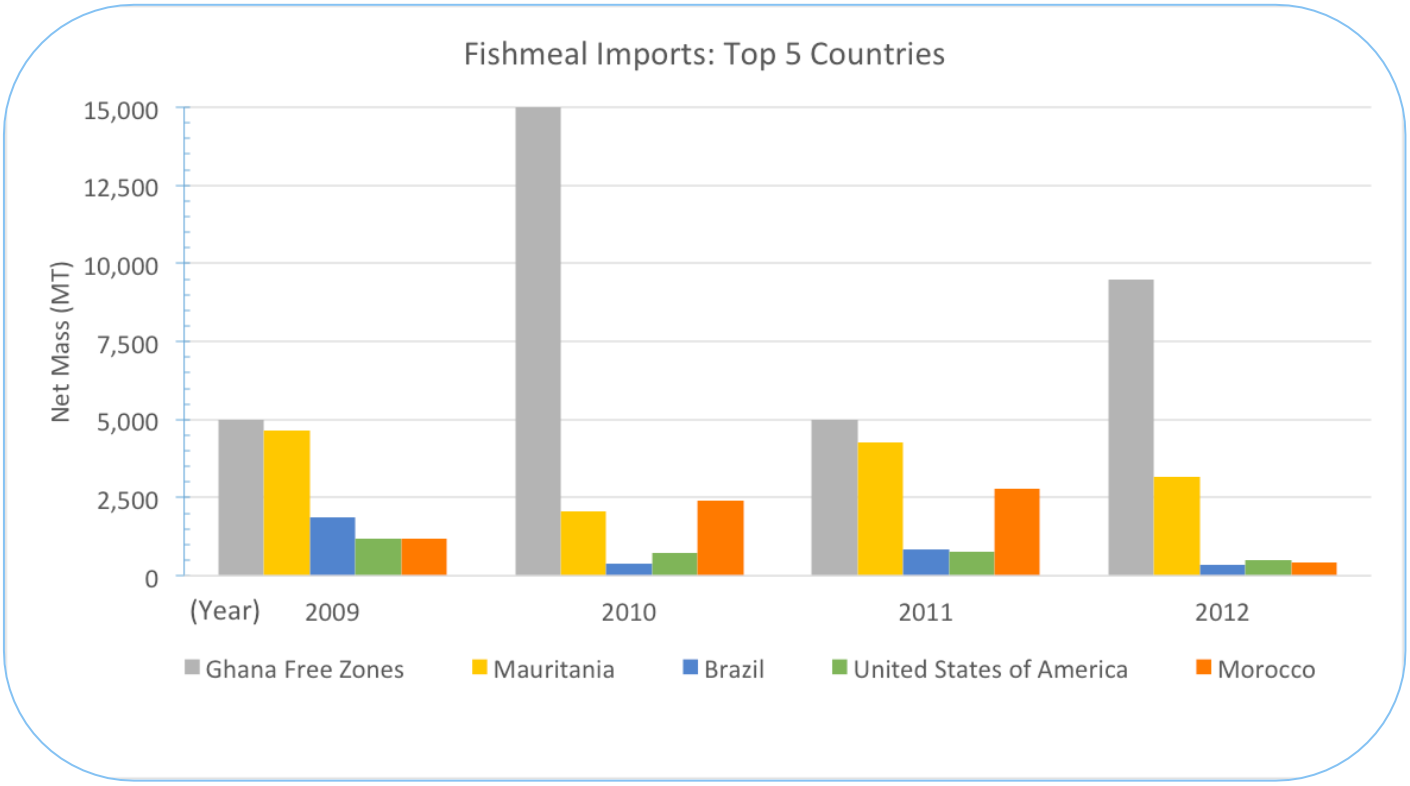
Products coded, "FZ", originated from the Ghana Free Zones Enclave and are treated by the GRA and this report as imports.

Fish Feed Imports



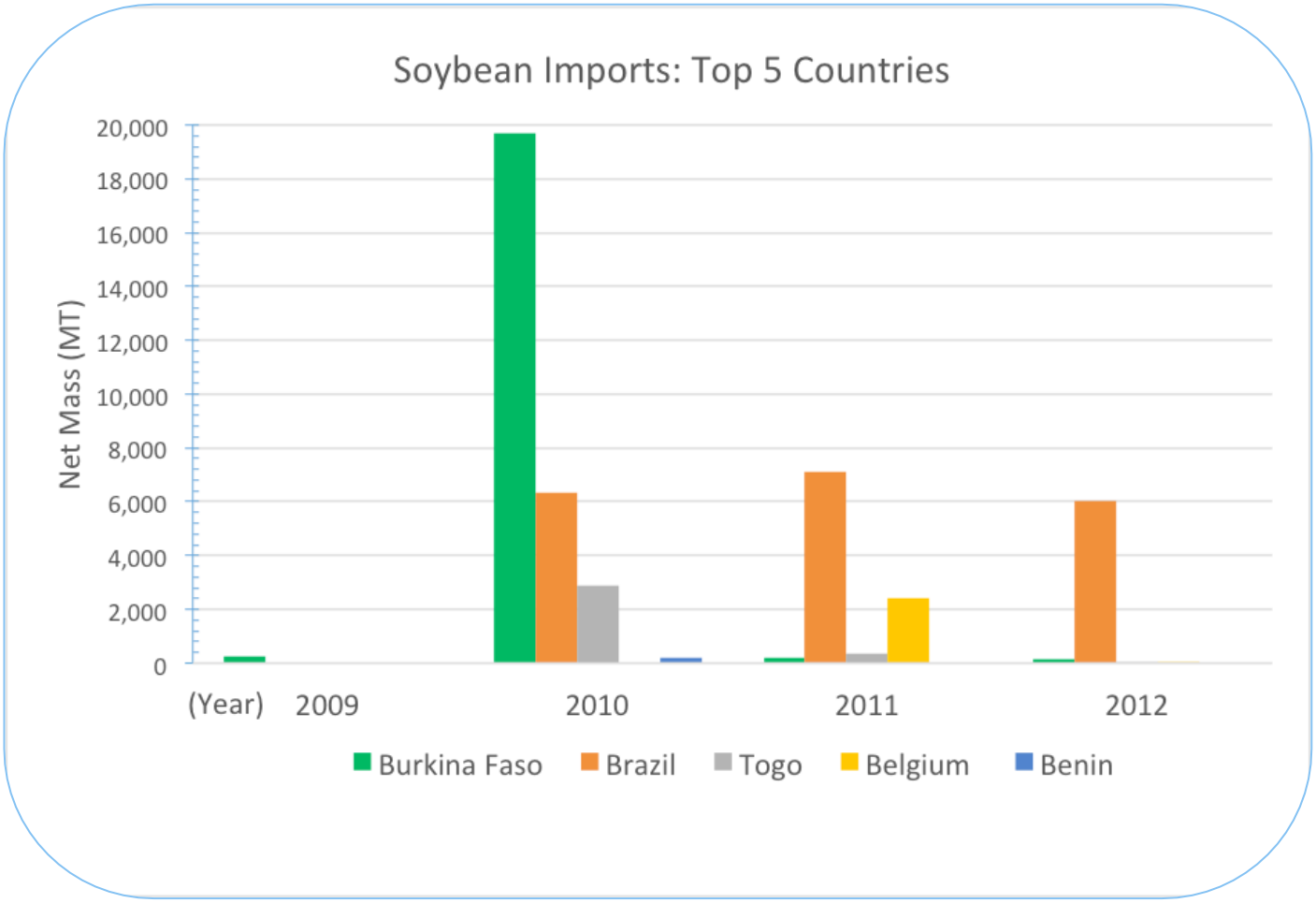
Brazil is still the largest source of fish feed into the country. Israel's contribution to fish feed imports had dropped significantly since 2011 in conjunction with the opening of Raanan West Africa.

Fishmeal Imports



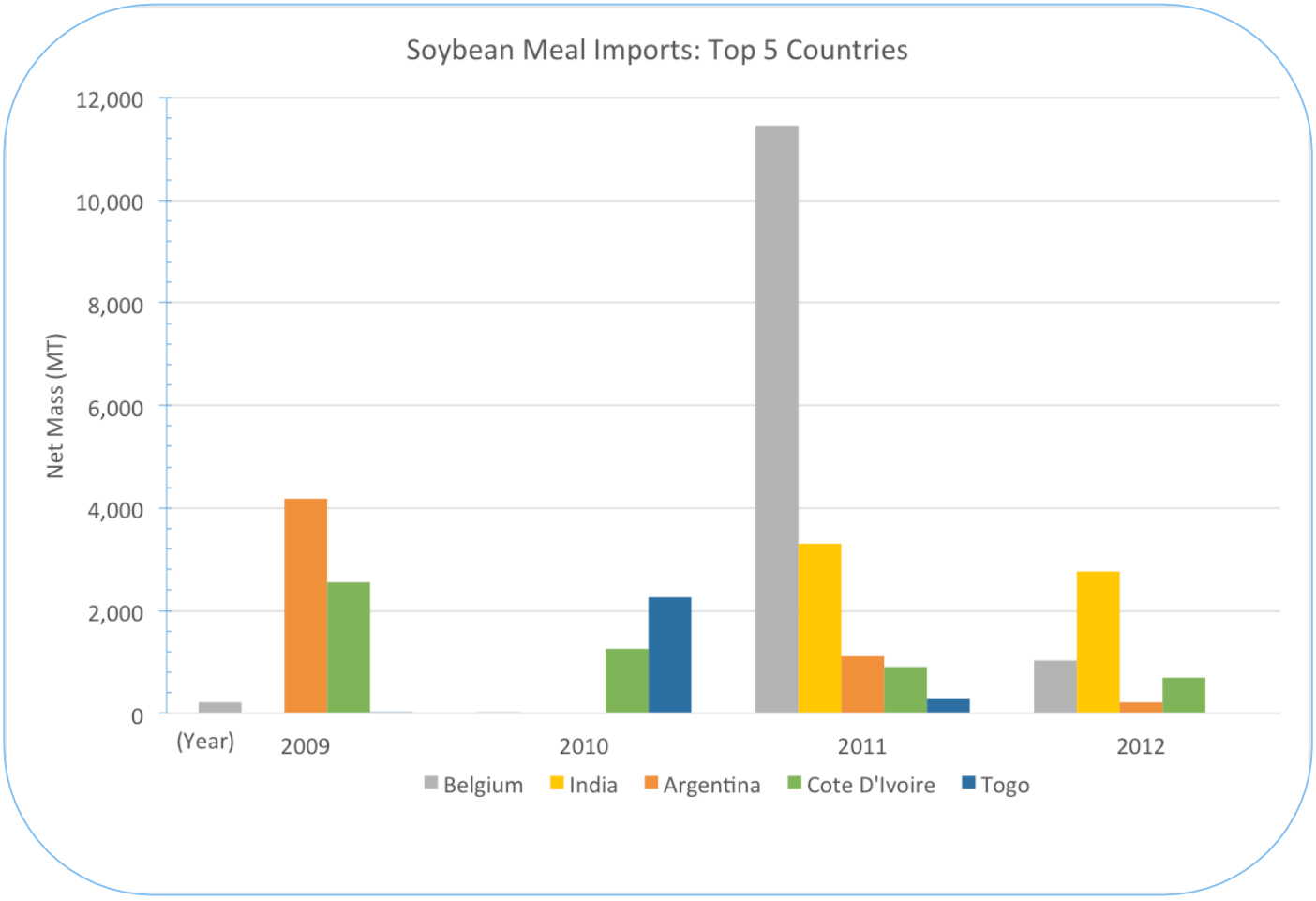
Total fishmeal imports remained consistent throughout the years 2009-2012. Much of the necessary fishmeal is obtained from the Ghana Free Zone, supplied by Ghana Protein.

Soybean Imports



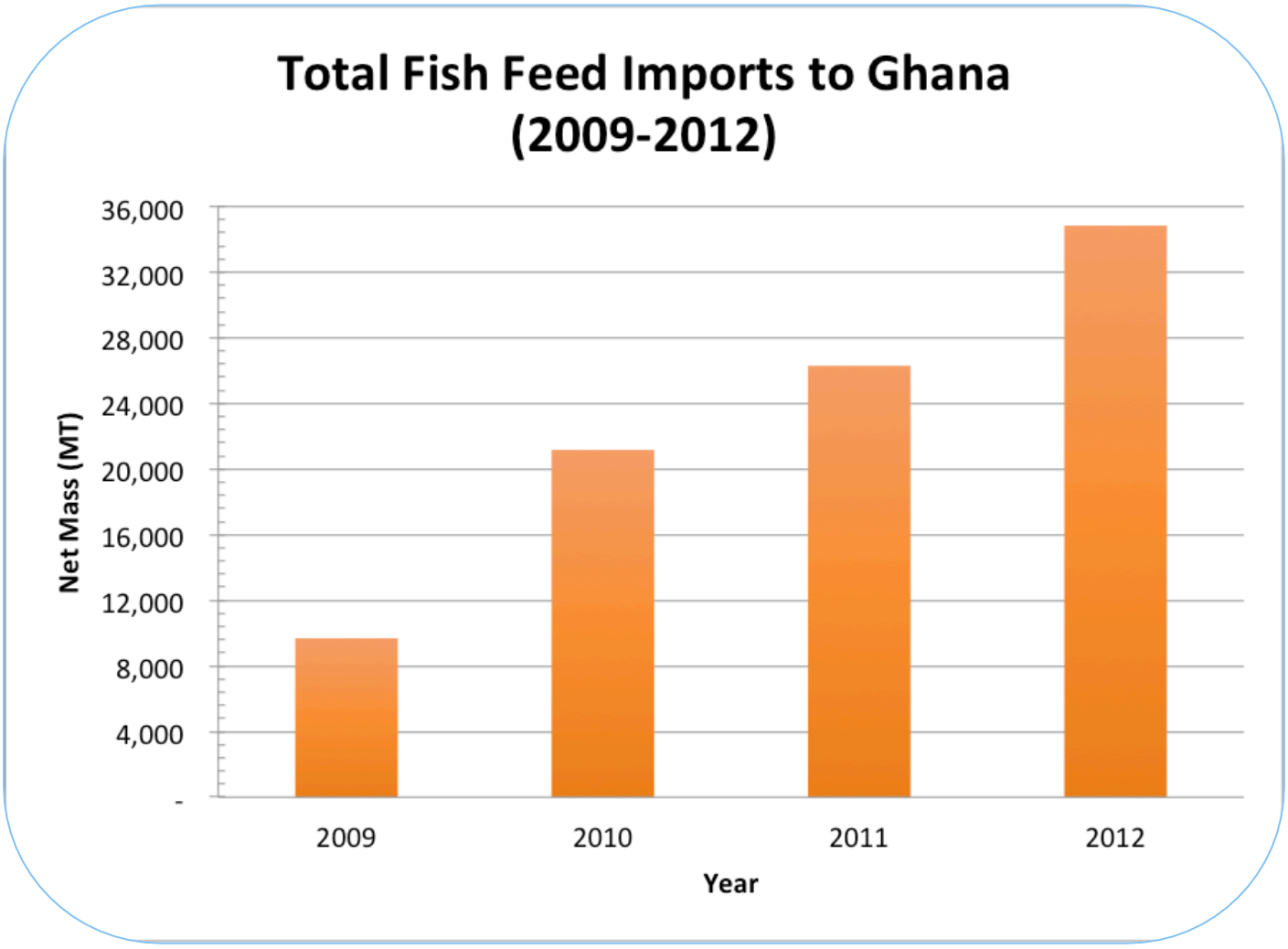
Total soybean imports into Ghana have been negligible throughout the period in questions except for 2010, when Ghana received almost 20,000 metric tons of soybeans from Burkina Faso. Because there are few soybean processing plants and almost no feed mills in West Africa, soybeans are entering the country in the form of processed fish feeds. Therefore, the growth of soybean demand is indicated by the growth in fish feed imports.

Soybean Meal Imports



Similarly, total soybean imports into Ghana have been consistently below 8,000 metric tons for the period in question, except for 2011 when Ghana received almost 12,000 metric tons of soybean meal from Belgium. Belgium is not a major soya producer and in this instance probably acted as the country of trans-shipment since Antwerp is a major consolidation port for shipments from the Americas to Africa.

Total Fish Feed Imports



As has already been stated, soybeans and soybean meal are entering the country in higher and higher quantities, however not in their raw form. Their growing presence in the market is signaled by the steady increase of imported fish feeds and the steady growth of the aquaculture industry. As ICAAE has long suspected, the soy is in the feed.

Compiled by

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